CONSERVING OUR SOIL RESOURCES.

A radio talk by Dr. Henry G. Knight, Chief, Bureau of Chemistry and Soils, delivered in the Department of Agriculture period, National Farm and Home Hour, Wednesday, January 11, 1933, broadcast by a network of 48 associate NBC radio stations.

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SALISBURY: Continuing and concluding his series of reports on results of the soils research of the Bureau of Chemistry and Soils, Dr. Henry G. Knight, the chief of that Bureau, today gives us a summary of the results of recent extensive research on the effects of and the remedies for soil erosion. This research is carried on by the soil scientists, engineers, foresters of the United States Department of Agriculture. But let's have the story of it from Dr. Knight.

KNIGHT: Thank you, Salisbury, I'll be glad to try to summarize the results of the 1932 research at the nine soil erosion experiment stations operated by the Department. I don't suppose any member of the Farm and Home Hour audience has to be told why the Congress authorized the Department to carry on research on soil erosion. Mr. Bennett and Mr. Jones and other speakers have been telling you repeatedly in the past two or three years of the ravages caused by soil erosion and of the danger of further damage every time enough rain falls to run down hill unless we can find means of stopping this annual toll that takes nearly 200 million dollars worth of soil and soil fertility every year.

As I have said, you know all these facts and more, for you have heard them many times. So I proceed to a very brief outline of the results of the experiments carried on last year at the nine soil erosion experiment stations already in operation.

We'll start with the station near Guthrie, Oklahoma, in the rolling part of the red plains section of that State. At that station, the bare soil lost three times as much soil and 14 times as much water as sod covered land. Land in continuous cotton cultivation lost over 14 tons of soil and 13 per cent of the water that fell on it as compared with 4 tons of soil and 11 per cent of water lost from each acre of land under a rotation of wheat, sweet clover, and corn.

Terraces at Guthrie have been very effective at stopping the erosion and saving water. The engineers also have been able to restore some very badly gullied land by using dams made of poles and brush. At this station we tried strip cropping on moderately steep slopes, growing cotton between strips of thickly planted sorghum. The erosion from the cotton was greatly reduced while that from the strips of sorghum was entirely stopped.

Now let's move on up to Missouri and inspect the results of the experiments on a farm near Bethany, in the northern part of that State. This is in the rolling part of the Western Corn Belt in a section where torrential rains fall at some season of the year. In the past these heavy rains have caused the loss of as much as an inch of top soil a year from land in continuous corn cultivation. In 1931, land that had been under cultivation in this region from 10 to 20 years produced 14 bushels of corn, as compared to crops of 51 bushels on the land that still retained its top soil.

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Terracing of course helps to stop this erosion. Our experiments have shown that already. They also have shown how to stop gullies which are just starting and to restore the original topography of the land by making dams of grass sod across the newly formed gullies. We have underway on this farm a long-time experiment. We have laid out three 10-acre fields, all of them badly eroded. On one field we are stopping the gullying and sheet washing with sod dams, pole dams, good crop rotations, and every other known device except terracing. Then in another field we are using those good practices plus terracing. And in the third field we are following the usual farming practices of the region. At the end of a term of years we shall have a very good comparison of the effects of these different farm practices in the way of checking soil erosion. We have still another erosion experiment station in the Corn Belt in southern Iowa near the town of Clarinda. We just started work at Clarinda so I cannot give you a statement yet of conclusive results. However, we tried out contour listing of corn to cut down the erosion losses last year and it worked splendidly. The field where we planted the corn in deep listed furrows, following the contour of the ground, lost practically no soil. An adjoining field planted up and down the slopes showed a soil loss of 22 tons per acre. Besides this work, we are studying the effect of rotations and of stable manures and of green manures upon the rate of erosion in these experiments near Clarinda on a typical loessial soil type of the middle Missouri Valley section.

Now let's turn Southward again. In the black lands of Texas, some of the greatest cotton lands of the world, we have an erosion experimental farm near the town of Temple. The chief development there last year and the year before was along the line of strip cropping as already mentioned in connection with the Guthrie, Oklahoma, Station work. Under this method which Bennett has explained to you before, farmers plant strips of thick-growing, soil-saving crops, such as oats, sorghum and sweet clover, along the contours of the field slopes. These are comparatively narrow strips. Then they plant broader strips of the clean-tilled crops, such as cotton and corn, between the strips of soil-saving crops. Practically no erosion or run-off came from the strip-cropped fields at the Temple station.

We are trying out the same system over in East Texas on the sandy lands of the type that you find in east Texas and Louisiana and in Arkansas. The experiment station in east Texas is near the town of Tyler. The strip-cropping method works pretty well there. But they have a very serious problem on those sandy clay lands of east Texas and Arkansas and Louisiana. This is the problem of the washing that takes place when the land is not protected by a cover crop. Lespedeza, one of the new plants of the clover family, is giving good results as a cover crop on our experimental farm.

Lespedeza also is giving good results at our experimental farm near Statesville, North Carolina, in the middle Piedmont region. We have just started to work at Statesville, so, once again, I can't give you any conclusive results. However, it is already apparent that farmers in the middle Piedmont and also in the sandy clay lands of Texas and Louisiana and Arkansas have somewhat the same problem of working out a farming system that will keep a cover on the land as many months of the year as possible. This is true even though lands of these sections are terraced. And by the way, I may say right here that the practice of rotation and the growing of cover crops simply make the effects of terracing doubly beneficial.

Now let's jump from North Carolina clear across the continent to the State

of Washington. The experiments out there on a farm in the eastern part of the State near Pullman have shown that the summer fallow system used in that region of scant rainfall leads to troublesome erosion. We have had good results from letting the wheat stubble stand in the fields that are to be fallowed. We also have had promising results on these Palouse winter wheat lands of the great Inland Empire of the Northwest by the use of the special cultivator which I will describe in connection with the work in the Kansas region of low rainfall.

Now coming back toward eastward, I can report to you further good results from the so-called "waffle" cultivator machine developed from our experiments near Hays, Kansas. Bennett and Jones and others have reported this machine to you. I'll just remind you that it digs about 10,000 holes, each of them holding 3 to 5 gallons of water, in the surface of each acre of land. You can see that these holes made by the waffle cultivator will hold the rain water and thus conserve moisture that is badly needed in the semi-arid Great Plains country where we're conducting these experiments. Fallowed land that had been waffled with this machine lost only 1 1/2 per cent of the total rainfall as compared with a run-off of a total of 31 per cent of the rainfall from an adjacent field that had not been waffled.

We have just started into experimental work at the farms in the upper Mississippi Valley loessial soil region at LaCrosse, Wisconsin, and in the Northwestern Appalachian section near Zanesville, Ohio. Next year we shall have more to report from these experiments.

And now I have given you a very, very brief summary of the results of the erosion research work at these nine experiment stations during the past year. Let me invite any of you living or visiting in the vicinity of Guthrie, Oklahoma, Temple or Tyler, Texas, Pullman, Washington, Bethany, Missouri, Clarinda, Iowa, La Crosse, Wisconsin, Zanesville, Ohio, or Statesville, North Carolina -- let me invite any of you who have an opportunity to visit our experimental farms near these places, to inspect carefully the demonstration plots showing the surprising extent of erosion from unprotected land. Also to talk with the men carrying on the experiments and learn from them at first hand of the methods that show most promise for checking erosion in these different soil types.

On Friday, January 20, I shall return to this microphone to give you the final report of this series -- the report will be on results of research to develop farm wastes into farm products.